THE USAGE OF ORTUS WEB SITE IN THE RTU STUDIES OF MATHEMATICS

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Introduction

Nowadays, with the increasing amount of technologies, the demand for qualified specialists which could act rapidly with the latest scientific developments, modern technologies and materials, as well as create qualitative global business – has increased too. Thus universities nowadays have to be ready to provide its students with such an education which could be competitive in the present environment and would develop the level of competences.

Reacting to these rapid changes the higher educational establishments of Latvia are improving their study programs, improve the quality of studies by updating the system of education, thus significantly improving the basis for the acquirement of modern knowledge and qualifications.

The draft law of the higher education paragraph 3 of Article 1 states:

The higher education – the level of education after the secondary level and the process in which students obtain intellectual maturity level in their chosen fields, which provides with the opportunity to think independently, to be aware of the limited characteristics of knowledge and to obtain the skill to use the knowledge in practical spheres accordingly to their qualifications, knowledge, skills and competences certified in the degree.

In order to raise the student's accountability for the study process and facilitate the ability for independent learning it is of a paramount importance to create intrinsic environment for self-motivated studies. Meaning, the students themselves are involved in setting their enabling objectives, plan the study process, presentations, as well as evaluate their work and together with course mates and lecturers agree on the final assessment. (Lamb, T.E., 2008)

Consequently, the self-motivated studies are defined as the student's active participation in the creation of the study plan, as well as in the acquirement of knowledge and skill and the assessment of their own results. (Gibbon, M, 2009).

It takes more understanding from the student of the study process, expected results, self-evaluation skills, determination, intrinsic motivation and responsibility. Everyone has to be able to analyze his/her own input in the creation of the process and determine his/her own stumbling blocks which blocked the way for the development.

Materials and Methods

A great assistance for the student's self-motivated studies is e-learning.

E-learning is an essential stream in transformation of society to so-called „information society". Nowadays it becomes an easily available and effective education tool. In engineers education it is widely spread, at least as a progressive support of traditional education. Many authors have been interested in its efficiency and in its particularities distinguishing it from traditional education. They say less about the teachers´ readiness for their working in e-learning.

The e-learning started through conversion of study texts into electronic form that brought their easy transfer and simplified retrieval of their content. This form, however, wasn't fully achieving the potential of e-learning. These days, it is far more dynamic and interactive, provides greater flexibility, modularity and many other advantages. Newer e-learning study materials use the multimedia content more extensively bringing a whole range of advantages. It makes the receiving of new information more simple, easy and comfortable and prolongs its storage in our memory. E-learning could be understood as a way of teaching, acquiring information, knowledge and skills using modern information and communication technologies.

The introduction of e-studies in the higher educational establishments does not mean only the creation of data basis which provides access to materials (Kellner, D., 2001) It also requires the organization of new teaching forms as well as a new way of assessing the acquired level of knowledge. (see Figure 1) The most important changes are regarding the reorganization of administration. It requires a new approach in task performance monitoring, as well as a new approach to final assessments and the issuing of certificates.
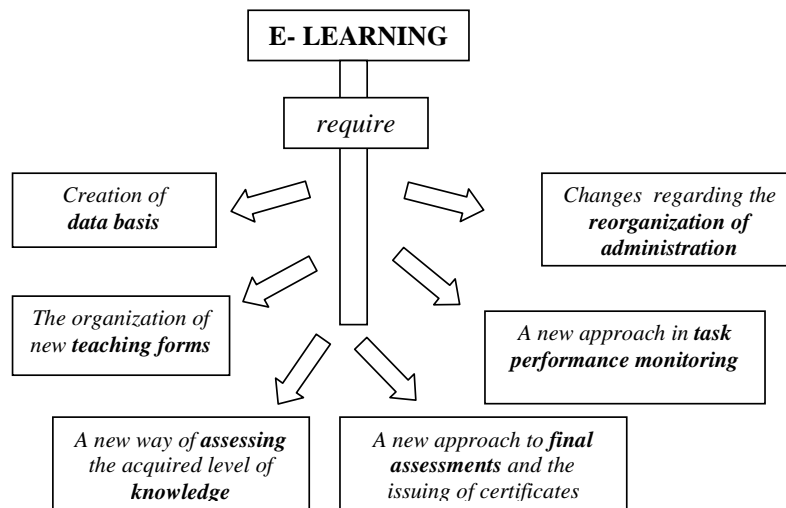
Figure 1. The introduction of e-learning in the study process of the higher educational establishments.

Well-structured e-learning system has 8 key functions (Rosenberg, M. J., 2001).:

- e-learning community in the digital world, where computers are used as everyday tools for creative production;
- e-Centre for smart functions:
  Extensive and accessible advanced collection of resources;
- enrichment:
  For excellence in education to develop personality and to improve productive thinking skills (creative thinking; critical thinking, Creative Problem Solving (CPS), and Future Problem Solving). Research studies revealed that: children who employ the Internet spend 37 % less time watching television and 16 % more time with friends and family .
- e-Mentoring *(also known as: telementoring; virtual mentoring; iMentoring):*
  E-mentoring is: a caring and structured relationship focuses on the needs of the mentored participants. It adds values to the lives of those involved, and uses advanced technology to connect people across time and/ or distance.It is seeking to help the gifted and talented to communicate with other individuals who are experts within a specific field.
- e-Guidance & Counseling:

  How could we cahnnel learners curiosity and employ e-learning to help them grow intellectually, socially, and emotionally

- evaluation of the organizational components & structure:

  We must answer to two important questions: „Why schools were not producing more creative persons?" and " Is there any correlation between traditional education and creative productiveness?"

- expertise & competences:

  As well as talented to build the required competencies for: lifelong careers; e-businesses; e-buy; and e-pay; …etc. It's"means:

      * Ability to search, collect, and process (create, organize, distinguish relevant form irrelevant, subjective from objective, real from virtual) electronic information , data and concepts and to use them in a systematic way" (Geser, 2007).

      * "Ability to use appropriate aids (presentations, graphs, charts, maps) to produce, present or understand complex information" (Geser, 2007).

      *Ability to employ e-learning (including Virtual Learning Environments (VLEs) to develop, support and facilitate productive thinking skills (creative thinking, critical thinking, creative problem solving, and future problem solving) and attitudes.

- evolutions in content, strategies, teaching methods, evaluation, …

SUGGESTIONS FOR TRANSITION TO SELF-MOTIVATED STUDIES (Gibbons, M., 2002)

- The introduction to the self-motivated process in **several study tasks**
- Self-planned study guidelines, **united creation of plan**
- Stimulate and teach for **self-reflection** and how to assess the process and the results
- The stimulation of independent thinking:
  - ✓ Formulate one's own judgments
  - ✓ Suggest one's own solutions for problems
  - ✓ Altering the content to question form

E-learning is learning (self-education, study) through electronic teaching tool, books, textbooks, that can be distributed in various ways and the educated can obtain study materials and information also by means of new information and communication technologies. At the same time, it is based on voluntary approach, consciousness, responsibility and ambitions of an individual student who is self-responsible for the selection of his study materials, the way he studies, his spacialisation as well as the search for possibilities of obtaining a certificate for his knowledge. He himself states (programmes) the goals of his education and adapts them to his own needs, conditions, life rhythm and lifestyle. This shows how the centre of education and responsibility for results is being transferred to the student even more. This form of education plays an important role in life-long education process, E-learning can be also a part of an organized form of sudy (education, learning), for example distance learning as well as attendance form of study.

The advantages of e-learning
- The documents are accessible at all times and in all places where the internet access is available
- It is possible to use heterogeneous data forms in the creation of global information blocks
- Technologies are a motivator for learning because it provides with different tools for the acquirement of academical knowledge
- If a person is working it is possible to solve the conflict of time and place
- Individual pace of studying

The disadvantages of e-learning
- The role of individual differences in the acquisition of special skills using online environment study materials
- How to provide with qualitative distance education in e-learning environment, effectively develop the collaboration on the internet, develop new forms of guidelines.
- Students are not aware of the requirements in e-environment. Are not aware how to study, how to discuss, how to work with study plan and collaborate with lecturers.

Results and Discussion

During the period when in Latvia there is a discussion on the higher educational establishment's quality and its development Riga Technical university (RTU) commencing with 2007/2008 academical year has transitioned to RTU united e-learning system using RTU website ORTUS which is based on e-learning program MOODLE (Modular Object-Oriented Dynamic Learning Environment).

The main task of ORTUS (www.ortus.lv), web site is to provide support for the scientific and administrative processes by facilitating effective communication. The establishment of ORTUS web site is advantageous to the students, the administration as well as improves the inner communication of the university by providing the administration with the necessary feedback from the students.

ORTUS at the moment is the most modern, widest and the most multifunctional higher educational establishment website in Latvia. At the moment there are integrated several subsystems which provide with united access to RTU e-services, giving advantages to the students, the lecturers and the administration by improving the university's inner communication, as well as providing with the opportunity for the administration to receive feedback from the students. The lecturer of each subject provides his/her students with various ways of self-preparation for tests and examinations. On the website there are posted the home tasks, the solutions of tasks, lectures and tests and by comparing the completed tasks the students can assess their level of readiness in each particular subject and its final examinations. (see Fig.2)
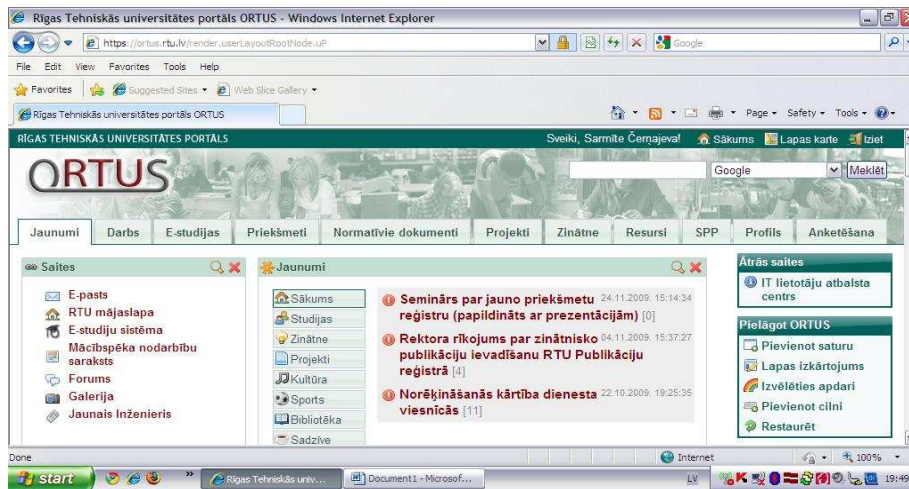
Figure 2. Riga Technical University ORTUS website

In the usage of the web site for the studies of mathematics it is essential to pay attention to the didactical aspects of the studies. Very important is the creation of the notes of the lectures and the suitable self-control tests. In the creation of the tasks, examples as well as the home tasks it is essential to set the difficulty level for each task and accordingly create the tasks by slowly increasing the difficulty level. It is also very important to create suitable marking scale system where would be included the motivation to attend the lectures and students could independently improve the knowledge of mathematics by using the given e-course. Thus it is of a paramount importance to create suitable 'blended learning' system where e-learning would rationally supplement the actual lectures

In order to clarify the student's opinion on the study work, the university has created a questionnaire system for the students in which the students evaluate each RTU subject's quality and the lecturer's work in the auditorium. This information allows objective assessment study methods, study materials, the work of lecturers and to initiate the necessary improvements. The forum of the website simultaneously provides the students with the answers to their questions and allows expressing their views on the topical questions in the study process, university administrative work, and politics and so on. Each day there are tens of new commentaries and in six month of its work there have been published and discussed a wide selection of topics and themes and now it has more than 5 thousand commentaries. At the moment ORTUS website provides the students with notice board and newspaper functions, giving information on topical events and activities in RTU. ORTUS provides the students with access to e-mails and RTU normative documentation. The students can find their study information (basic data, personal data, the history of orders, notices on payments) ORTUS website has got an integrated e-learning system (courses with the lecturer's study materials, current events, home tasks and a discussion space)

ORTUS website is an integral part of RTU which is proven by a great number of visitors and with each year it is increasing. (see Fig. 3)
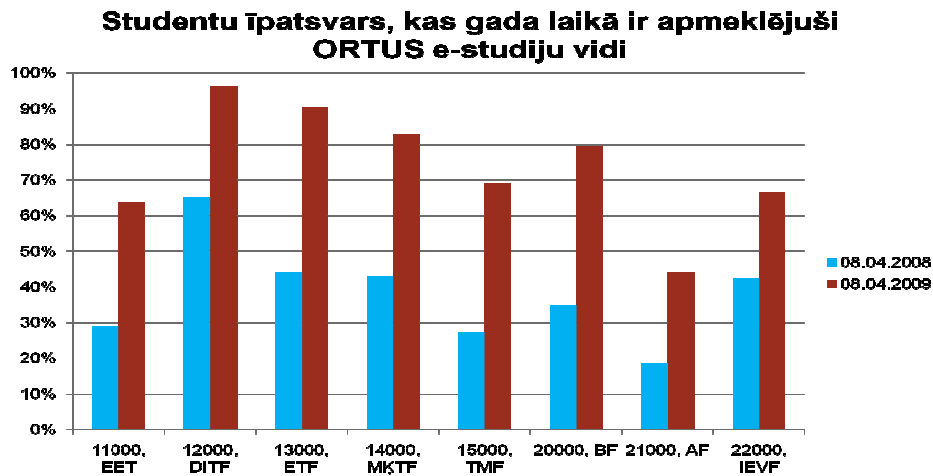
Figure 3. Student's density of the yearly visits of ORTUS e-study environment. (Zitmanis Z., 2009).

The ORTUS environment is also widely used in the study process of Mathematics in RTU. Students have a chance to read the materials once again and to study separate tasks in their own way. In order to control the self-motivated studies there have been created theory self-control tests (found after each lecture) and task self-control tests (found after the examples of task performances). In ORTUS students also get the possibility for individual home tasks. Carrying out RTU student questionnaire it was discovered that the most popular areas are lectures (37%) and the examples of task performances (38%). (see Fig. 4). Only 14 % of students use the possibility of self-testing which shows on a rather low level of self-motivation.
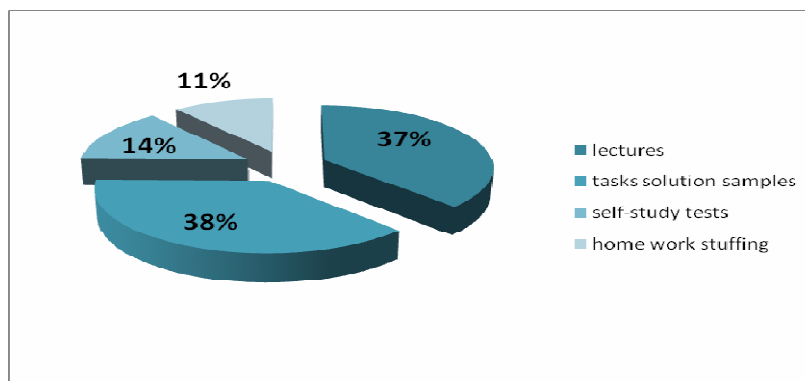

Fifure 4. Types of ORTUS teaching materials used in the learning process

It's evident also from the results of the questionnaire on student's readiness of studying mathematics in e-environment. Only 11% are ready to study Mathematics in e-environment, 85% of students are not ready and 4% said that they would be ready to do so if it was the only way how to do it. (see Fig. 5).
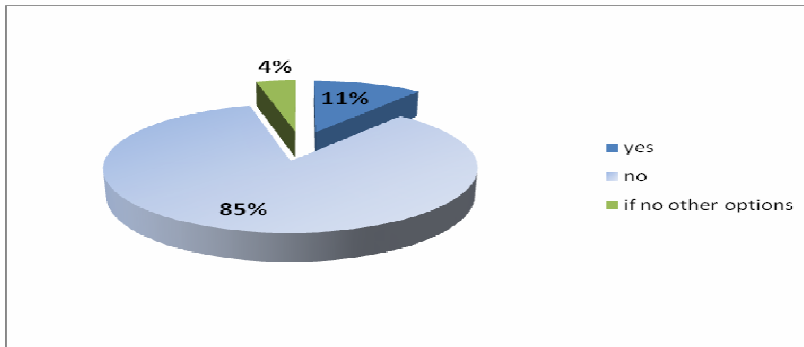
Fifure 5. Students' willingness to study mathematics independently in the e-environment

The ORTUS environment is a good assistant in the study process of Mathematics – 92% of students gave a positive response (see Fig. 6) only 4% of students said that ORTUS materials do not help in the study process and 4% said that they do not use them at all.
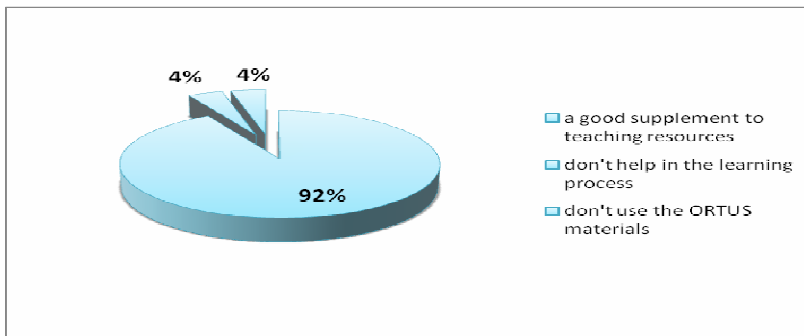

Fifure 6. Students' views on the use of ORTUS material in Mathematics learning process at Riga Technical University

The fact that the ORTUS materials are used rather actively in the study process could be proven by the frequent visits of the website. (see Fig. 7) 9% of the students visit the website more than once a week and 70% of the respondents said that they visit the site at least once a week.
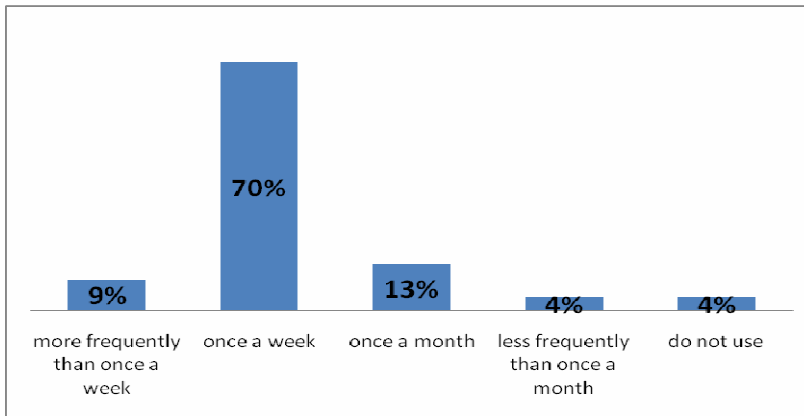

Figure 7. Frequency of use the ORTUS material in Mathematics learning process at Riga Technical University

Conclusion

ORTUS is an environment where the student has the access to all information of studies – schedule, the description of all subjects, the requirements for successful passing of examinations, study materials, access to

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international data bases and so on. At the moment ORTUS website has 10 000 RTU visitors per week. It has to be mentioned that RTU IT office has received Latvian IT association prize 'Platina pele 2009' as well as pattern recognition for outstanding achievements in the development of RTU website ORTUS

In 8 January 2010 RTU presented a new website ORTUS for the students of the secondary level with the aim to develop a yet-to-be student's community group and allow them beforehand step into shoes of real students, to choose the right program where they could continue their studies after finishing high school. The website will support all the potential students no matter where they live – it will be a possibility to find out all the necessary information on RTU without going to the capital. In the website the students will receive free of charge the preparatory materials for their final examinations in Chemistry, Physics, Mathematics and the English language, as well as all the information on RTU study programs, preparatory courses, the entry requirements, the feedback from the present students and all the information which could be useful for the potential students. The secondary level students can also ask questions to students, lecturers and the staff of RTU.

The website will not be static. It is constantly going to be improved reacting to the needs and wants of the secondary level students: it will be updated with materials, tests, topical information and with time there will also be lecturers feedback on studies at RTU. It is also planned to organize mini-competitions with prizes (even a computer). At the moment there are 6000 users of the website.

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